Your Seattle City Light

Memorandum

DATE : June 10, 1986

TO : Distribution List

FROM : Kris Benson Kris

SUBJECT : Proposed Evaluation of our PCB Sampling Procedures

Attached is a proposed scope of work and work plan for the evaluation of Seattle City Light's quality assurance measures for PCB sampling. This work is to be conducted by Environmental Affairs Division's continuing consultant, Parametrix, Inc.

As you recall, we met in April to discuss this project. It was agreed that an evaluation would be useful to (1) determine if variability in analysis results are due to sample collection or laboratory analysis procedures, or both and (2) make recommendations to improve our sampling quality assurance procedures, where appropriate.

In conjunction with this evaluation, Terry and I proposed sending replicate oil samples to different labs, including our contract lab and two others who have offered to analyze 3 "introductory - free" samples (National Chem Lab and Portland General Electric Lab). However, our consultant has recommended that we have these samples analyzed in triplicate, to also test for replicability. I think this is a good idea, but to justify the additional expense, I would suggest we select only those labs that we might consider using in the future. I'm not sure if we would choose to contract with either National Chem Lab or PGE Lab due to their distant locations. I would like to hear what you think about this, and if your Division could pay for analysis costs.

Please also give me your comments on the scope of work proposal. After I have heard from you, I will negotiate a final scope of work and budget with Parametrix.

Also, note that given our budget constraints, the entire scope of work cannot be accomplished at this time. Parametrix suggested conducting the evaluation for oil sampling now and postponing that of soil sampling. Other ways that we might reduce the budget is to decrease the effort that is proposed for developing the manual, decreasing the scope of evaluation of laboratories, or you may have additional thoughts. Still another way to address budget

531-1.(1-83)

CTY0069151

SEA315565

constraints would be to add to the budget with money from your divisions. Environmental Affairs has committed $5000 and so any amount up to that could be authorized for additions to the contract task. Even if we stay within the $5000 limit, we would appreciate some contribution from your division(s).

KB:jf

Distribution List
Al Cuplin
Dan Haw
Gerd Jerochim
Terry Kakida
George Rauch

Attachment

w/attachment
cc: Macdonald
Sickler
Hunich
Fletcher
Luboff
Benson-2
Minteer
EAD 980.6
File

SCOPE OF WORK

Parametrix will assist Seattle City Light (SCL) in evaluating current SCL protocols for sampling and analysis for PCBs in transformer oils and soils. PMX will then furnish recommendations for improving practices. The scope of work will address three items, namely:

1. Evaluation of field activities performed by SCL personnel (e.g., design of sampling approach, variation due to sampling by different personnel, methodology of sample collection, preparation of samples for laboratory analysis, proper use of field analysis kits);

2. Evaluation of analytical procedures performed by laboratories under contract to SCL (e.g. interlaboratory and intralaboratory variability).

3. Development of a QA/QC guidance manual to be used by SCL personnel in developing sampling and analysis plans and in evaluating the plans of others.

Each of these items is discussed in more detail below:

Evaluation of Field Activities

Parametrix will evaluate current sample collection and preparation protocols through the following activities:

- Interviews with SCL employees to determine the current level of understanding regarding accepted QA/QC practices,
- Observation of field activities to document current protocols, provide a basis for making recommendations regarding potential improvements in sample collection, preparation, and field determination practices, and
- Literature reviews of guidelines on relevant QA/QC practices (e.g. USEPA approved methods for Superfund RI/FS sampling).

These reviews of field methods will focus on sampling of insulating oils in transformers and other electrical equipment. We will also include a review of activities related to the sampling of soils potentially contaminated with PCBs.

Parametrix will review SCL's field testing kits for rapid screening of samples for PCBs levels. We will evaluate the kits considering accuracy of results, reproducibility of results, and cost per sample. Parametrix will also provide an evaluation of

the overall value of field screening kits within the framework of a comprehensive sampling and analysis program for PCB management.

Review of Analytical Procedures

Parametrix will design a methodology for evaluating the following sources of variability in analysis for PCBs:

- Interlaboratory variability,
- Intralaboratory variability, and
- Intermedia variability.

Evaluation of interlaboratory variability will involve dividing a uniform PCB-contaminated oil sample into subsamples and having each of three contract laboratories selected by SCL perform identical analyses on them. PMX will evaluate the degree to which the results from these separate laboratories agree and will provide a discussion and recommendations regarding the acceptability of the observed levels of interlaboratory variation.

Evaluation of intralaboratory variation will involve submission of blind split samples to each laboratory along with field blanks to determine the reproducibility of results. This could be in conjunction with the analyses described above. This could also be achieved by the analysis of serial dilutions of material from a single source for blind analysis within a given laboratory.

Evaluation of variability among samples from different media will include a discussion of the degree of variability expected for samples of soils as compared to samples of transformer fluids. For soils, this would involve an evaluation of variability within soil samples with different characteristics which could introduce sampling bias (e.g. grain size or organic content). For oils, we would review selected literature with respect to the possibility of partitioning of PCBs into stratified layers within the oil in transformer units, stored in drums or other common storage situations. Guidance will be provided to assist in recognition of situations requiring specialized sampling strategies. Procedures assuring adequate characterization of PCBs concentrations under such circumstances will be outlined.

Development of a QA/QC guidance manual.

The anticipated final product will be a guidance manual outlining acceptable sampling and analysis procedures including guidelines on specific quality assurance/quality control issues of concern. The manual would be structured as follows:

Title: **Quality Assurance/Quality Control Guidelines for the Sampling and Analysis of PCBs**

PARAMETRIX WORK PLAN

Parametrix can provide a substantial part of the Scope of Work within the specified budget constraints. In order to keep within your allotted budget, we recommend that this work plan be limited to evaluation of PCBs in oil carrier fluids. The proposed budget would not be sufficient to address issues related to soil sampling and analysis.

Keeping within your proposed budget, our efforts would include the following:

- Two man-days to observe field activities to document current sampling protocols and to provide a basis for recommended improvements. We should plan to coordinate schedules such that field time is optimally used for the purposes of both SCL and Parametrix.
- Three man-days for literature review.
- One man-day for the evaluation of analytical laboratory data.
- Five man-days for the development of the guidance manual.

To support our effort, we request that you consider the following sampling and analysis program to provide analytical data. Our proposed approach toward evaluation of inter- and intralaboratory variation will require that you provide us with the results of the following:

1. From a single, homogeneous sample of oil containing X ppm PCBs, prepare samples at three dilutions (e.g., X=full strength, X/10, and X/100)
2. Split each dilution into three subsamples, such that each of the three SCL contract laboratories may analyze for PCBs at all three different PCBs concentrations.
3. Each laboratory should then analyze each sample at the three concentrations in triplicate.

This procedure would require the analysis of 27 samples. The data would be used to evaluate interlaboratory variation (i.e., agreement between laboratories on the PCBs concentration present at each dilution); intralaboratory variation (i.e., agreement within a single laboratory across triplicate samples analyzed at each dilution); and reliability of analyses as a function of sample concentration (e.g., within a lab, does analytical variation increase substantially as sample concentration decreases?).

The precision with which dilutions of PCBs-containing oil are prepared critically affects the ability to evaluate results. We recommend that the series of dilutions be prepared under stringent conditions by one of the laboratories. Reducing any of the variables involved (i.e., number of contract labs, dilutions, or samples analyzed) will reduce your overall cost with a corresponding reduction in the reliability of the data and our ability to draw meaningful conclusions from that data.

To evaluate the effects of potential stratification of PCBs in oils, we would request that you perform sampling and analysis of waste oil in temporary storage prior to disposal. We would request that three samples be taken from three different horizons within a single container of known PCB contaminated oil. These samples could be obtained using a thief type sampler. The samples should then each be analyzed in triplicate for PCBs. This results of such a sampling and analysis effort should provide confidence in the evaluation of variability of PCBs concentration at each of the depths sampled. This information could be important to you in evaluating just how representative a single oil sample may be of the entire container.

To summarize, we are requesting that you perform some specific sampling, have a laboratory prepare serial dilutions and split samples of oils, and perform 36 or more analyses for PCBs.